

Using Trail Cameras Help To Evaluate The Source And Impact Of Predation On Leach's Storm Petrels (*Hydrobates leucorhous*)

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Introduction

- Predation at the breeding site is a major threat to seabirds, particularly Leach's Storm Petrel, a species **in decline across its range in the N. Atlantic** [4,6,14]
- An important colony persists at **Country Island** in Nova Scotia, where a research camp is present through the summer field season (19-May to 27-July) to monitor seabird species-at-risk (Fig 1) [9,13]
- Predators considered to be potential threats are **American Herring Gulls, Corvid spp. (American Crow and Common Raven), North American River Otters, and Eastern Meadow Voles** [9,14]



Figure 1: Country Island, NS, Canada [1,3,10]



Research Questions

- **When are Leach's Storm Petrel most vulnerable to certain predators throughout their breeding season?**
- **Does presence of researchers and distance from human activity impact predator and Leach's Storm Petrel presence?**

Methods

- 16 motion-triggered trail cameras set in the Eastern, Central, and Western regions of the island (Fig 2)
- Locations chosen for petrel burrow density (≥ 3), varying distances from research camp, and suitability of environment for camera installation
- 47,524 images analyzed using Camelot [10], annotating each observation with species, sex, age, and behavior (if a predator)
- Probabilities of species occurrence by location and period of the season were estimated using Generalized Linear Mixed Models (GLMM) with binomial response variables [2,7,8,12]

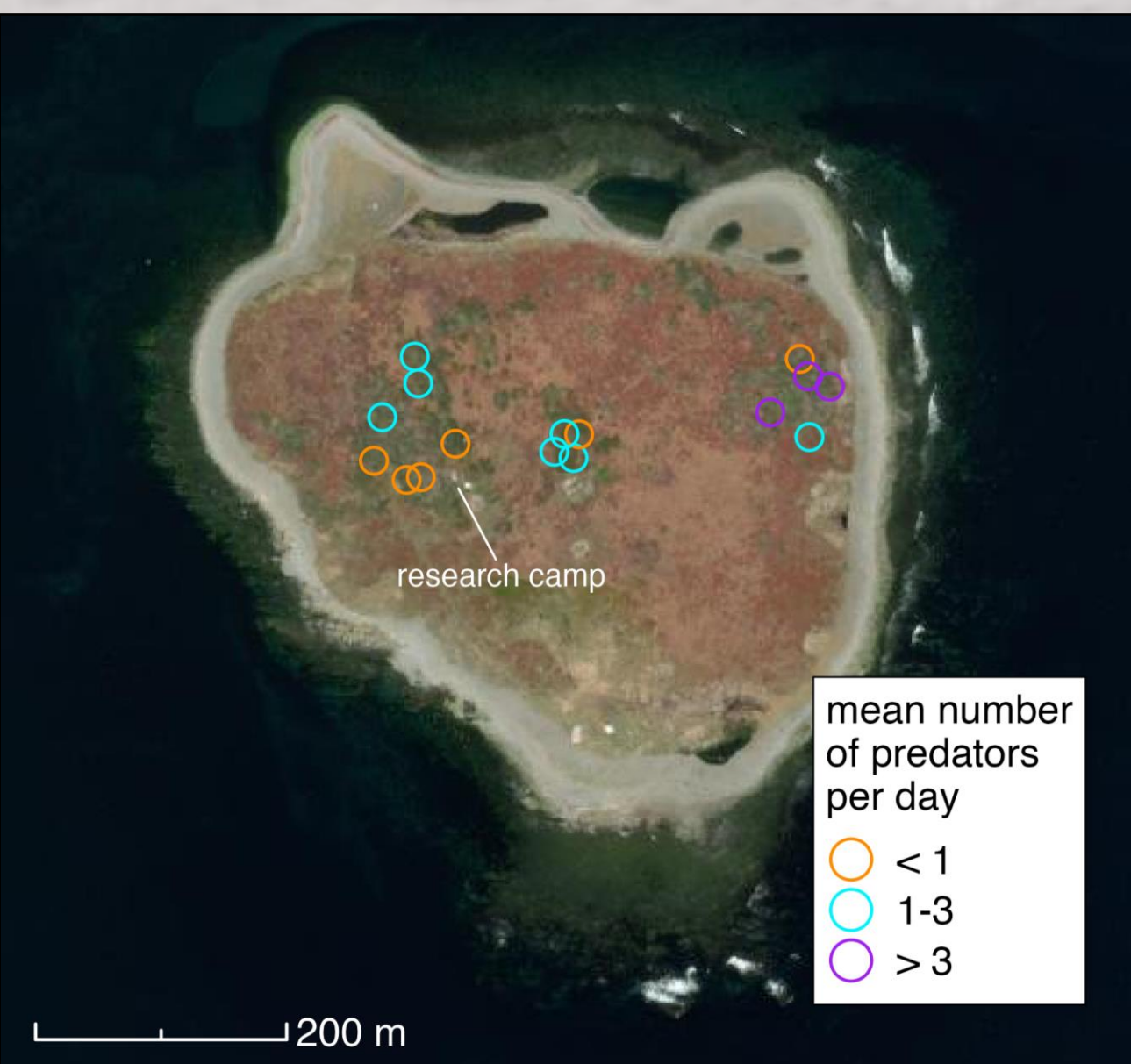


Figure 2: Mean number of predators per day at each of the 16-camera trap stations across Country Island from 19-May to 21-November 2023 [1,3,11]

Results

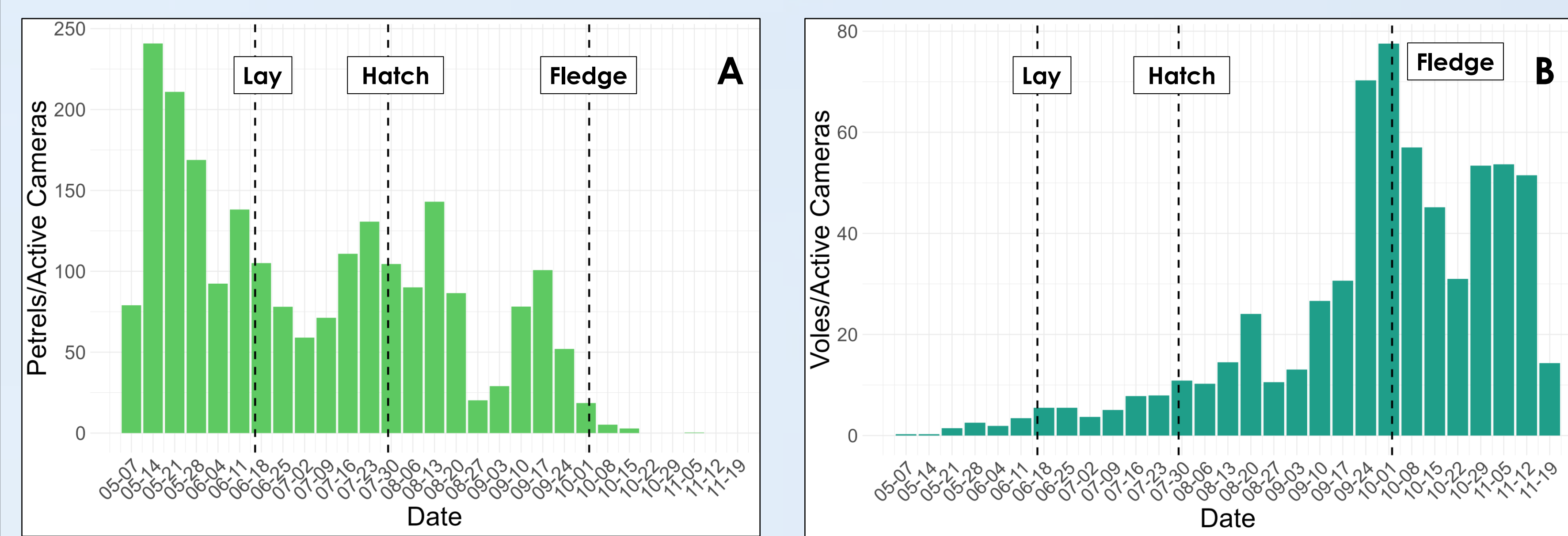


Figure 3: Number of (A) Leach's Storm Petrel and (B) Eastern Meadow Vole per active camera by week interval from May-November; vertical dashed lines indicate mean petrel lay, hatch and fledge dates [5,15]

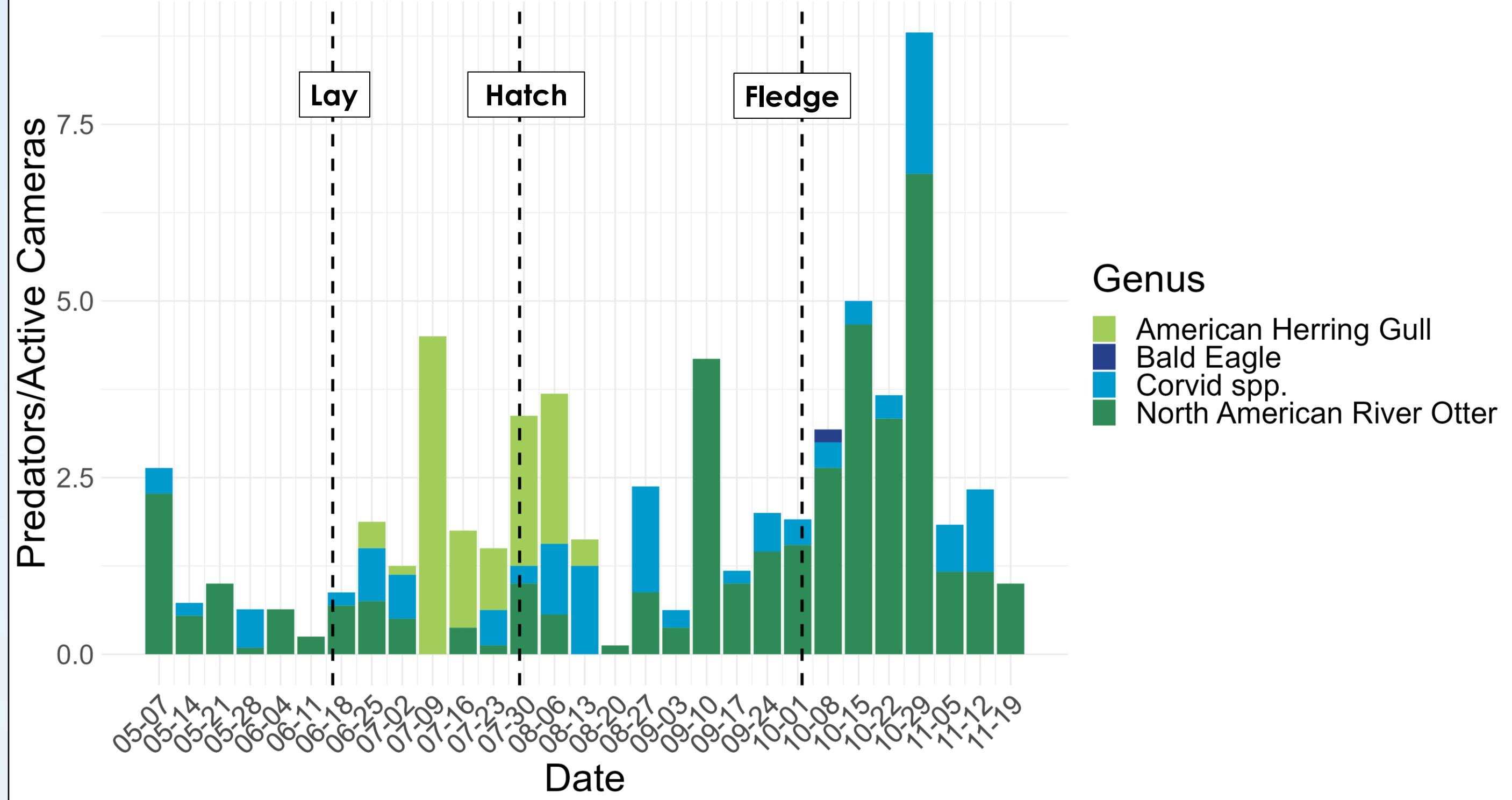


Figure 4: Number of predators (excluding Eastern Meadow Voles) per active camera by week interval from May-November on Country Island with vertical dashed lines representing mean lay, hatch, and fledge dates [5,15]



Figure 5: (A) Probability of predator occurrence (Corvid spp., North American River Otters, American Herring Gulls, and Bald Eagle) estimated using GLMM with an interaction term between region and period [2,7,8,12] and (B) Trail camera image from the Eastern region of the island taken 17-Oct (post field season) displaying a North American River Otter carrying a Leach's Storm Petrel in its mouth

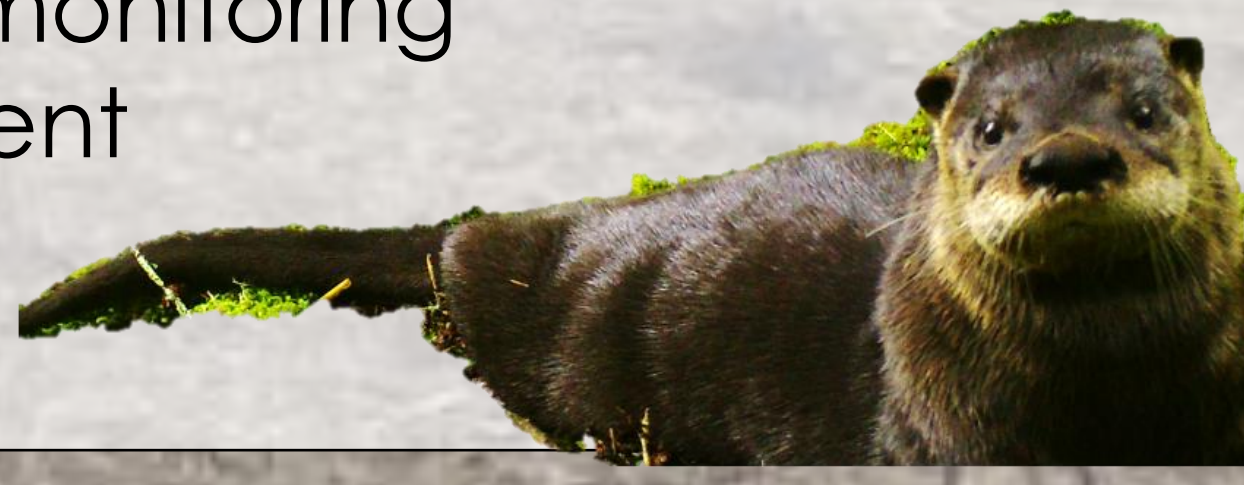
Discussion

- Vole activity is highest just before the petrel fledge date, however we don't have evidence indicating that voles prey on larger petrel chicks so predation is unlikely (Fig 3B)
- All gulls sighted were chicks and no gulls were seen past their fledge date, making them **unlikely predators** (Fig 4)
- Otter presence was consistently highest leading up the petrel fledge date, potentially indicating that **highest risk of predation might be late September and early October** (Fig 4)
- Corvid spp. presence was consistent throughout the breeding season but was highest in early November (Fig 4) while there are fewer petrels and chicks on the island by this point, Corvid spp. presence throughout the season remains a threat, with another small peak in activity just after the petrel hatch date (Fig 3A,4)
- **Period and region had strong effects on predator presence ($p < 0.001$), and the interaction between them showed a weak effect ($p = 0.058$, Fig 5A)** (Fig 5A)
- Predator presence is generally higher in the East and Central woods and is lowest during the field season in the West woods, which is nearest the field camp. This could indicate that **the presence of researchers on the island, especially near hubs of activity, impacts predator presence** (Fig 2,5A,5B)



Conclusion

- There is some evidence to suggest presence of researchers deters predators
- This information can inform **when** and **where** predator presence is the highest on the island
- The trail cameras did not capture frequent active predation, however North American River Otter and Corvid spp. seemed to pose the greatest risk
- This could impact future monitoring and predator management



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References

